Part 2 of 10

O K L A H O M A
DEPARTMENT OF ENVIRONMENTAL QUALITY

STEVEN A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

BRAD HENRY
Governor

DEC 08 2003

Mr. David Neleigh 6PD-R
US EPA
1445 Ross Avenue
Dallas, TX 75202

SUBJECT: Applicability Determination No. **98-117-AD (M-2)**
Wynnewood Refinery
Alterations to FCCU Catalyst Regenerator
Garvin County, Oklahoma

Dear Mr. Neleigh:

Air Quality has completed the review of a proposed replacement of a Fluid Catalytic Cracking Unit reactor cyclones as summarized in the Evaluation of Applicability Determination No. 99-117-AD (M-1) dated November 19, 2003, (copy enclosed). Based on the information received, we believe that the project would qualify as routine maintenance, and request EPA's concurrence on this determination.

Thank you for your cooperation in this matter. If you have any questions on this issue, please contact Mr. David Schutz at (405) 702-4198.

Sincerely,

Dawson Lasseter, P.E.
Chief Engineer
AIR QUALITY DIVISION

enclosure

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6PD-R

STEVEN A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

BRAD HENRY
Governor

DEC 08 2003

Mr. Chris Hawley
Environmental Manager
Wynnewood Refining Company
906 S. Powell
Wynnewood, OK 73098

SUBJECT: Applicability Determination No. **98-117-AD (M-2)**
Wynnewood Refinery
Alterations to FCCU Catalyst Regenerator
Garvin County, Oklahoma

Dear Mr. Hawley:

Air Quality has completed the review of the operation referenced above as summarized in the Evaluation of Applicability Determination No. 99-117-AD (M-1) dated October 1, 2003, (copy enclosed). Based on the information received on September 4, 19, and 25; and November 13, 2003, a construction permit is not required for this project.

Thank you for your cooperation in this matter. If we can be of further service, please contact our office at (405) 702-4198.

Sincerely,

David S. Schutz, P.E.
New Source Permits Section
AIR QUALITY DIVISION

enclosure

cc: Wynnewood DEQ Office, Garvin County

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

STEVEN A. THOMPSON
Executive Director

BRAD HENRY
Governor

DEC 08 2003

Mr. David Neleigh 6PD-R
US EPA
1445 Ross Avenue
Dallas, TX 75202

SUBJECT: Applicability Determination No. **98-117-AD (M-2)**
Wynnewood Refinery
Alterations to FCCU Catalyst Regenerator
Garvin County, Oklahoma

Dear Mr. Neleigh:

Air Quality has completed the review of a proposed replacement of a Fluid Catalytic Cracking Unit reactor cyclones as summarized in the Evaluation of Applicability Determination No. 99-117-AD (M-1) dated November 19, 2003, (copy enclosed). Based on the information received, we believe that the project would qualify as routine maintenance, and request EPA's concurrence on this determination.

Thank you for your cooperation in this matter. If you have any questions on this issue, please contact Mr. David Schutz at (405) 702-4198.

Sincerely,

Dawson Lasseter, P.E.
Chief Engineer
AIR QUALITY DIVISION

enclosure

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM **November 19, 2003**

TO: DPL Dawson Lasseter, P.E., Chief Engineer, Air Quality Division

THROUGH: PF Phillip Fielder, P.E., Engineering Section

THROUGH: Herb Neumann, P.E., Tulsa Regional Office

THROUGH: Peer Review

FROM: DS David Schutz, P.E., New Source Permits Section

SUBJECT: Evaluation of Applicability Determination No. **98-117-AD (M-2)**
Wynnewood Refining Company
Alteration of Fluid Catalytic Cracking Unit Reactor Cyclones
Wynnewood, Garvin County, Oklahoma
906 S. Powell
Located Immediately South of Wynnewood on US-77

SECTION I. INTRODUCTION

Wynnewood Refining Company operates a petroleum refinery (SIC 2911) in south-central Oklahoma. The facility is currently operating under Permit No. 98-117-TV issued June 28, 2002. That permit incorporated requirements of Permit No. 1998-117-C (PSD) issued April 16, 2001, for the facility Fluid Catalytic Cracking Unit (FCCU).

The facility is proposing to replace the "reactor cyclone" system in the refinery's FCCU. FCCU operations commence with a "reactor section," where fresh feed oil is blended with catalyst and the stream is heated to elevated temperature (900-1,100°F). This reaction converts heavy oil into lighter hydrocarbons suitable for gasoline blending and hydrocarbon gases (methane, ethane, propane, etc.), but solid carbonaceous residue (coke) accumulates on the catalyst. Following processing in the reactor section, the catalyst is separated from the hot gas stream by the reactor cyclones. The catalyst proceeds to regeneration (burn-off of coke). Following regeneration, the catalyst is separated from combustion gases and recycled to the reactor; the combustion gases are processed by an electrostatic precipitator (ESP) prior to discharge to the atmosphere.

The area affected by the proposed project is where catalyst is separated from the gas/vapor stream being processed by the FCCU, prior to regeneration of the catalyst. The current system involves four cyclones, operating two apiece in two stages. All discharge from the existing reactor section will first be processed by a "vortex disengaging section," then proceed to two high-efficiency cyclones. The initial "vortex disengaging" is expected to reduce "overcracking," or additional cracking of heavy hydrocarbons to gases (methane, ethane, ethylene, propylene, etc.) or to coke. Once catalyst is separated from the gas/vapor stream, the reaction stops. Catalyst will then proceed to the existing regeneration step. The existing catalyst regenerator will not be affected nor will the capacity of the unit change; it remains limited by equipment in other parts of the unit.

The project is designed to change the amount of feed which is currently cracked to gas (methane, ethane, etc.), recovering those hydrocarbons as liquids suitable for gasoline blending. An estimated additional 210 barrels per day of gasoline components will be recovered from the FCCU following construction of the proposed changes. VOC emissions will increase slightly (0.006 TPY from increased throughput in liquid storage tanks resulting from less conversion of liquids to gases or solids). There will be a negligible decrease in emissions of NOx, CO, and SO_2; by a slight reduction in coke generation, emissions resulting from coke burn-off will be reduced.

The replacement has been planned to be with higher-efficiency cyclones. However, design specifications and performance guarantees are not available. Higher-efficiency cyclones would have a slight but negligible increase of loading on the catalyst regenerator. Emissions from an FCCU are primarily from the catalyst regenerator with lesser emissions from fugitive equipment leakage. The proposed project is not part of the catalyst regenerator and does not involve any valves, flanges, etc.

SECTION II. FACILITY DESCRIPTION

The refinery converts crude oil into a variety of liquid fuels, solvents, asphalt and liquefied petroleum gases (LPG). Operations at the facility are divided into four categories: storage tanks, process units, utilities and auxiliaries, and blending and loading. The facility includes 20 process units for distillation and chemical reaction operations, 107 storage tanks, 40 combustion units, 4 additional combustion units operated for controlling air pollution emissions, product and raw material loading/unloading units, and auxiliary units for waste handling. The facility capacity is 54,000 barrels per day crude oil input. Crude oil arrives primarily by pipeline and also by truck and rail.

A. Process Units

There are 25 separate processing operations identified by the Wynnewood Refinery process flow diagram. These operations are identified as the No. 1 Crude Unit, No. 2 Crude Unit, Straight Run Stabilizer, Merox Unit, No. 1 Splitter, No. 2 Splitter, Naphtha Unifiner, Hydrogen Plant, Hysomer Unit, Crude Vacuum Unit, ROSE (Residual Oil Supercritical Extraction) Unit, CCR (Continuous Catalyst Regeneration) Platformer, Hydrocracker, Fluid Catalytic Cracking Unit, Plat Depropanizer, Deisobutanizer, Olefins Treater, Propylene Splitter, Alkylation Unit, Fuel Gas Treater, Fuel Gas Drum, Asphalt Oxidizer, Asphalt Blending, Distillate Blending, and Gasoline Blending. The refinery also operates gasoline, distillate, asphalt, LPG (liquefied petroleum gas), NaSH (sodium hydrosulfide), solvent, and slurry loading facilities and steam and utility systems.

Crude oil processing begins at the No. 1 and No. 2 Crude Units. First, salt, water, and inorganic particles are separated from the crude oil which is then distilled. In the distillation process, the crude is divided into several fractions depending on boiling point of the hydrocarbons present. Streams from the Crude Units include light hydrocarbons (methane, ethane, propane, butane) which become refinery fuel gas and liquefied petroleum gas (LPG), straight run gasoline, naphtha, distillate, and residual streams such as gas oil and reduced crude. The residual oil, referred to as "reduced crude," is first processed in the Crude Vacuum Unit where additional gas oil is distilled out at reduced pressures. The gas oil from the crude units and the vacuum unit become the primary feed to the Fluid Catalytic Cracking Unit (FCCU). As an intermediate step, some of the vacuum bottoms are processed for removal of asphaltenes/resins in the ROSE (Residual Oil Supercritical Extraction) Unit before proceeding to either the Asphalt Oxidizer or FCCU.

The FCCU heats residual hydrocarbons to 900-1,000°F in the presence of a silica-based catalyst to convert the "gas oil" into lighter components. The large organic molecules break into smaller components. Most of these lighter components (about 60%) are recovered for gasoline blending. Other lighter components are recovered as reactants for other refinery processes, fuel gas, olefins, LPG, and "light cycle oil." Heavy oil off the bottom of the unit is sold as slurry oil. Some of the organic materials become "coke" on the surface of the catalyst that is regenerated by burning off the coke before re-circulating the catalyst back to the FCCU.

Some of the light naphtha is processed by the "CCR Platformer Unit." "CCR Platformer" is a shortened form of "continuous catalyst regeneration platinum-catalyzed reformer" which converts naphtha into aromatic components of gasoline such as benzene, ethyl benzene, toluene, and xylene.

Other gasoline blending components are prepared by combining smaller organic components in the LPG range into heavier components. Olefins separated from the processes (mostly as products of the FCCU) are reacted in the presence of hydrogen fluoride (HF) to form larger heptane and octane molecules.

Sulfur must be removed from sour refinery fuel gas, blending components, and reactants which will become blending components. WRC treats refinery fuel gas by controlled contact and chemical reaction with sodium hydroxide (NaOH). The product of the reaction (NaSH) is generally sold to the pulp and paper industry. Some distillates are processed by a "Merox" unit, in which high-strength sodium hydroxide reacts with mercaptans and converts them to disulfide oils which remain in the product. Light naphtha is treated in a "Unifiner" Unit. "Unifining" is equivalent to hydrodesulfurization, where hydrogen gas is used to react with hydrocarbons, breaking off sulfur as hydrogen sulfide and lesser amounts of other Total Reduced Sulfur (TRS) compounds such as methyl sulfide. Hydrotreating also converts larger olefins into aliphatic hydrocarbons and naphthas which are not prone to form gummy resins during storage. An amine unit is used to further reduce the H_2S content of some of the fuel gas. The H_2S-containing gas from the amine unit is burned in the Aklylation Units depropanizer reboiler (Heater 5H1, a "grandfathered" unit).

Hydrotreating requires large amounts of hydrogen gas to be created. Most of the hydrogen is created by "steam reforming." Here, steam is mixed with hydrocarbons such as methane in a reaction such as $CH_4 + H_2O \rightarrow H_2 + CO_2$. The Platformer Unit also creates a large amount of hydrogen gas. Unreacted hydrogen gas is vented from other units into the Refinery Fuel Gas system.

In addition, this refinery includes a "Hysomer Unit." This unit is commonly referred to as an "Isomerization Unit," which changes the molecular structure of organic compounds into ones more favorable to gasoline blending. This refinery also operates a hydrocracker. Similar to the FCCU, this unit cracks larger molecules into ones in the size range for gasoline blending.

For compliance purposes, the facility has reorganized the 25 process units into 10 process unit areas that also includes associated tankage. This is allowed under 40 CFR Part 63, Subpart CC.

B. Storage Tanks

There are 107 storage tanks at the refinery. Of these, 27 are pressure vessels operated with only fugitive emissions. The other 80 are operated at atmospheric pressure. Most of the tanks store organic liquids, but hydrogen fluoride (HF) and hydrogen chloride (HCl) are also stored.

There are several rules and regulations affecting storage tanks, depending on liquid stored, capacity, vapor pressure, hazardous air pollutant (HAP) concentrations, and date of construction/reconstruction. The tanks' designs are internal floating roof, external floating roof, vertical cone roof, and horizontal.

These tanks include raw material storage, product storage, and storage for intermediates. Having intermediate storage allows various process units to keep operating when upstream or downstream units are down or operating at reduced capacity. The presence of intermediate storage allows for delineation between process units as necessitated by NSPS Subpart GGG and 40 CFR Part 63, Subpart CC.

C. Utility Operations

Utility operations provide fuel and steam to heat various operations, and allow for discharge of waste.

Refinery fuel gas is a blend of natural gas, non-condensable gases, gases from relief valve discharge, unit purges, and a variety of process unit off-gases. A wide spectrum of gases generated in the refinery which are combustible become refinery fuel gas. These gases are combined in a single fuel mix drum for supply to all units within the refinery. Ideally, the refinery would generate the same amount of fuel gas as is needed, but in reality, fluctuations result in purchasing natural gas and in flaring excess fuel gas. The fuel gas averaged 764 BTU/SCF heating value in 1999.

The mix drum blends three streams, "sweet" gases from the platformer, "sour" gases from other units, and pipeline-grade natural gas. Sour fuel gas is contacted with sodium hydroxide to remove sulfur compounds as liquid sodium hydrosulfide. Gas from this unit will have 200-500 ppm H_2S, which cannot be burned in a unit subject to NSPS Subpart J unless its sulfur content is reduced to 160 ppm. The stream is split into two portions, with one going to a diethanolamine (DEA) contactor for sulfur removal, while the other goes to a glycol dehydration unit.

There are three boilers at the facility. These boilers are designated Boiler #4, Boiler #5, and Wickes Steam Boiler 1-B-8. The Wickes Boiler was converted from being the FCCU waste heat recovery boiler to being a dual-fueled boiler in 1979. It is now fueled exclusively by fuel gas.

Three flares are present at the facility. The South Flare burns releases from relief systems and vents in the Crude Units, Crude Vacuum Units, Hydrocracker Unit, Hysomer Unit, No. 1 Naphtha Splitter, No. 2 Naphtha Splitter, Merox treater, ROSE Unit, RFG Unit, and miscellaneous units located at the south end of the facility. There are two North Flares, the new ("Peabody") flare installed in 1991 and a back-up flare. These flares burn releases from the Naphtha Unifiner Unit, CCR Platformer, FCCU, Deisobutanizer Unit, Plat Depropanizer Unit, Alkylation Unit, LPG loading rack, and pressure tanks for propane, butane, and olefins. The new Flare is designed to process 150,000 lb/hr. Excess pressure diverts additional hydrocarbons to the back-up flare.

Wastewater is collected throughout the refinery. The most significant source is the crude oil desalters, where oily water is separated from crude oil. Various units generate additional wastewater with varying degrees of oil content. The refinery segregates stormwater that falls outside the process areas into a separate wastewater system that discharges through a permitted stormwater outfall. Stormwater that falls in process areas is not collected in separate sewers, but some units do preliminary oil-water separation prior to discharging into integrated sewers. There is an initial oil-water separator adjacent to the Crude Desalter and another one adjacent to the Crude Unit, Hydrocracker, and Platformer. Oily water proceeds to an API separator then to an Activated Sludge unit. Sludge is periodically collected and dewatered for shipment off-site, while water continues to clarifiers and lagoons, and eventually to the Washita River.

Those wastewater handling units which are subject to NSPS Subpart QQQ are grouped as Emission Unit Group No. 57.

D. Blending and Product Loading Operations

Equipment is present for shipping or receiving several hydrocarbon products: LPG, gas oil, asphalt, propylene, isobutane, n-butane, gasoline, jet fuel (JP-8), and diesel. LPG, gas oil, propylene, and butanes are both bought and sold by the refinery, depending on market conditions, short-terms excesses, etc. Sodium hydrosulfide is also loaded as an aqueous solution and slurry.

Gasoline blending is done on a batch basis using large tanks. The several components are metered into the tanks. The tanks perform dual roles, both as process equipment and storage equipment.

Gasoline products are sold by either pipeline or truck. The truck loading rack is equipped with a vapor recovery unit to recover the hydrocarbon vapors displaced out of the mobile tanks loaded.

SECTION III. EQUIPMENT

The project will affect emissions from the following units.

EUG 11 – External Floating Roof Tanks, Constructed prior to 6/12/73, Subject to MACT

EU	Point	Normal Contents	Capacity	Installed Date
P-T144	P-T144	Premium unleaded gasoline	55,000 bbl.	1954
P-T147	P-T147	FCCU gasoline	80,000 bbl.	1952

The above units do not have throughput limits, so the expected increase in throughput (210 bbl/day) will not affect the compliance status of the tanks.

EUG 85 – FCCU Regenerator Subject to NSPS Subpart J and MACT II

EU	Point	Equipment	Installed Date
P-1ME258	P-1ME258	FCCU catalyst regenerator	1978

SECTION IV. EMISSIONS

The facility operates up to 8,760 hours per year. FCCU emissions were taken from Permit No. 78-051-O (M-3) for everything but PM_{10} and from stack testing for PM_{10}; 98% control of CO and VOC was assumed for the regenerator. The rated capacity of the FCCU is 21,000 BPD (875 bbl/hr). Tank emissions were calculated using the EPA program, TANKS4.09.

EUG 11 – External Floating Roof Tanks, Constructed prior to 6/12/73, Subject to MACT

EU	Contents	Vapor Pressure (psia)	2002 Throughput (bbl)	2002 VOC Emissions (TPY)	Post-Project Throughput (bbl)	Post-Project VOC Emissions (TPY)
T-144	premium unleaded gasoline	5.99	1,134,000	27.509	1,390,650	27.512
T-147	FCCU gasoline	3.86	6,080,900	25.670	6,157,550	25.673
TOTALS				53.179		53.185

EUG 85 – FCCU Regenerator Subject to NSPS Subpart J

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO *	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
P-1ME258	FCCU regenerator	15.4	67.5	437.4	1916.0	62.1	272.1	3.8	16.9	9.52	41.7

* Permit No. 98-117-TV does not limit CO emissions; values were taken from Permit Application No. 98-117-TV (M-1).

SECTION V. PSD ANALYSIS

Under current EPA policy, the cyclone replacement is treated as a modification unless the facility could show that the project constitutes "routine maintenance, repair, and replacement" (RMRR). Whether a project constitutes routine RMRR depends on a four-factor test as stated in a federal court case involving the Wisconsin Electric Power Port Washington generating station.

1. Nature and extent
2. Purpose
3. Frequency
4. Cost

The four factors must be evaluated as a whole. Interpretation of these factors was discussed in an Environmental Appeals Board case regarding the Tennessee Valley Authority, "Before the Environmental Appeals Board, United States Environmental Protection Agency, Washington, D.C., In re Tennessee Valley Authority, Docket No. CAA-2000-04-008." (The document was obtained from EPA's New Source Review web page.)

1. Nature and Extent

In evaluating "nature and extent," salient questions include whether major components of a facility are being modified or replaced; specifically, are the units of considerable size, function, or importance to operation of the facility, considering the type of industry?

The proposed project is to maintain the FCCU in its present capacity, 21,000 BPD. No modification of the FCCU is contemplated since its capacity is limited elsewhere by design (pump sizes, materials, reactor volumes, etc.).

The FCCU is a major component of the refinery. For a processing capacity of 55,000 BPD crude oil, the FCCU is capable of processing 21,000 BPD, or 38% of the total input. The cyclones, although necessary for operation of the unit, are a less significant component than would be catalyst regeneration, feed pumps, blenders, etc.

In the TVA case, EAB evaluated various items, including:

a. whether significant components were involved
b. whether the project was performed with facility personnel or outside labor
c. planning time
d. implementation time (i.e., unit downtime)

Here, significant components are involved, but a well-designed unit would not include any insignificant components. This project will be conducted by outside personnel; however, the facility is a relatively small refinery which lacks a large maintenance staff. The planning time is insignificant, relating only to cyclone design parameter data collection and waiting for a scheduled turnaround. The implementation time is stated at 21 days, which is actually less than the normal period for inspection and repairs (30 days).

2. Purpose

The purpose of the project is primarily to retain the unit in its present capacity; no increase in capacity is anticipated to result.

It is uncertain whether the project would result in a significant life extension of the FCCU. The serviceable lifespan of the FCCU as a whole is unknown. However, moving parts, parts in severe environments, and parts subject to abrasive do wear out. Normally, from an engineering perspective, such parts are designed to last a given time based on material wear and deterioration predictions, and are generally designed to be readily replaced.

3. Frequency

The unit was constructed in 1954. The cyclones have already been replaced in 1965 and 1979. They were recommended for replacement in 1995. However, in the context of an impending sale of the refinery, the replacement was not conducted.

In evaluating whether a replacement is "routine," the EAB stated that a "once or twice-in-a-lifetime occurrence" is not routine. Without the questionable maintenance decision in 1995, this would have been the fourth such replacement. The cyclone vendor, Fisher-Klosterman, has recommended that cyclones be replaced every 10 to 15 years. Thus, it would seem that regular replacement of cyclones is contemplated throughout the lifespan of the unit.

The TVA case utilized an automotive analogy: some components are expected to wear out and be replaced (such as headlights and tires), while others would constitute major overhaul items (engine or transmission). The reactor cyclones would be analogous to tires.

4. Cost

The estimated cost is $5.9 million, compared to the insured value of the FCCU of $109.5 million. The cost of the project will be treated as an expense rather than a capital expenditure.

In the TVA case, TVA treated the costs of their life-extension projects as capital expenditures, therefore, the EAB stated that it was unlikely that the costs were routine maintenance.

Further, EAB stated that any determination as to whether a project is an "expense" or "capital expenditure" should depend on Generally Accepted Accounting Principles (GAAP). The IRS publication 534 states that expenditures on petroleum refinery units must be less than 7% of the value of the unit to be considered "expenses." Here, the project is expected to cost 5.4% of the cost of the unit, which is less than the 7% threshold.

Conclusion

Applying the four factor test, it is concurred that the project will constitute routine maintenance, repair, and replacement. It will not be a "modification" in the context of PSD.

SECTION VI. NSPS ANALYSIS

A facility may become subject to NSPS based on construction, reconstruction, or modification.

Construction
The FCCU was constructed in 1954, prior to the effective date of Subpart J (June 11, 1973).

Modification
"Modification" is defined as any physical or operational change which results in an increase in emission rates of any pollutant subject to regulation. Subpart J affects PM, SO_2, and CO. The more efficient separation of catalyst from the flow should result in a slightly earlier termination of the cracking reaction, which will mean less CO and SO_2 from coke burn-off.

The FCCU is already subject to Subpart J based on a modification in 1978. That modification made the unit subject to emissions standards for PM and CO, but not SO_2 based on an exemption in 40 CFR Part 60.100(c) for FCCUs which were modified prior to January 17, 1984.

The proposed project is expected to result in a slight decrease in SO_2 emissions based on a more efficient termination of the catalytic cracking reaction which will result in less coke generation on the catalyst, and therefore less SO_2 resulting from coke burn-off in the regeneration. Since SO_2 emissions should decrease slightly, the FCCU will not be "modified" in the context of NSPS Subpart J.

Reconstruction
"Reconstruction" is defined as replacement of components of an emission unit such that the fixed capital costs of the new components would exceed 50% of the cost of a comparable entirely new facility.

Subpart J affects the FCCU catalyst regenerator but does not affect the FCCU itself. Since the entire cost of the project, $5.9 million, will be spent upstream of the catalyst regenerator, the FCCU catalyst regenerator will not be reconstructed.

SECTION VII. OKLAHOMA AIR POLLUTION CONTROL RULES

OAC 252:100-1 (General Provisions) [Applicable]
Subchapter 1 includes definitions but there are no regulatory requirements.

OAC 252:100-3 (Air Quality Standards and Increments) [Applicable]
Subchapter 3 enumerates the primary and secondary ambient air quality standards and the significant deterioration increments. At this time, all of Oklahoma is in attainment of these standards.

OAC 252:100-4 (New Source Performance Standards) [Applicable]
Federal regulations in 40 CFR Part 60 are incorporated by reference as they exist on July 1, 2002, except for the following: Subpart A (Sections 60.4, 60.9, 60.10, and 60.16), Subpart B, Subpart C, Subpart Ca, Subpart Cb, Subpart Cc, Subpart Cd, Subpart Ce, Subpart AAA, and Appendix G. NSPS standards are discussed in the "Federal Regulations" section.

OAC 252:100-5 (Registration, Emissions Inventory, and Annual Operating Fees) [Applicable]
The owner or operator of any facility that is a source of air emissions shall submit a complete emission inventory annually on forms obtained from the Air Quality Division. Emission inventory information has been submitted and fees paid for past years.

OAC 252:100-8 (Permits for Part 70 Sources) [Not Applicable]
Part 5 includes the general administrative requirements for part 70 permits. Any planned changes in the operation of the facility which result in emissions not authorized in the permit and which exceed the "Insignificant Activities" or "Trivial Activities" thresholds require prior notification to AQD and may require a permit modification. Insignificant activities mean individual emission units that either are on the list in Appendix I (OAC 252:100) or whose actual calendar year emissions do not exceed the following limits:

- 5 TPY of any one criteria pollutant
- 2 TPY of any one hazardous air pollutant (HAP) or 5 TPY of multiple HAPs or 20% of any threshold less than 10 TPY for single HAP that the EPA may establish by rule
- 0.6 TPY of any one Category A toxic substance
- 1.2 TPY of any one Category B toxic substance
- 6.0 TPY of any one Category C toxic substance

Emission and operating limitations have been established from previous permits and applications for those emission units required to have limits and are currently in effect under Permit No. 98-117-TV.

OAC 252:100-9 (Excess Emission Reporting Requirements) [Applicable]
In the event of any release which results in excess emissions, the owner or operator of such facility shall notify the Air Quality Division as soon as the owner or operator of the facility has knowledge of such emissions, but no later than 4:30 p.m. the next working day. Within ten (10) working days after the immediate notice is given, the owner or operator shall submit a written report describing the extent of the excess emissions and response actions taken by the facility. Part 70/Title V sources must report any exceedance that poses an imminent and substantial danger to public health, safety, or the environment as soon as is practicable. Under no circumstances shall notification be more than 24 hours after the exceedance.

OAC 252:100-13 (Prohibition of Open Burning) [Applicable]
Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in this subchapter.

OAC 252:100-19 (Particulate Matter) [Applicable]
Subchapter 19 limits PM emissions from various processes which are both process and fuel-burning equipment. Limitations are specified based on process weight rate. The process weight at the FCCU is the sum of the catalyst circulation rate (up to 800 TPH) plus the gas oil charge rate. Assuming a specific gravity of 1.05 and a feed rate up to 833 BPH, a gas oil feed rate of 153 TPH is calculated for a total process weight rate of 953 TPH. An emission limit of 77 lb/hr is calculated for this weight rate, per Appendix G. The anticipated PM emissions rate from the FCCU, 15.4 lb/hr, is in compliance with Subchapter 19.

OAC 252:100-25 (Visible Emissions and Particulates) [Not Applicable]
No discharge of greater than 20% opacity is allowed except for short-term occurrences which consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity. The FCCU is subject to an NSPS opacity limitation, therefore it is not subject to Subchapter 25.

OAC 252:100-29 (Fugitive Dust) [Applicable]
Subchapter 29 prohibits the handling, transportation, or disposition of any substance likely to become airborne or windborne without taking "reasonable precautions" to minimize emissions of fugitive dust. No person shall cause or permit the discharge of any visible fugitive dust emissions beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or to interfere with the maintenance of air quality standards. Most facility roads are paved, and FCCU catalyst handling equipment is enclosed. These measures achieve compliance with the "reasonable precautions" requirement.

OAC 252:100-31 (Sulfur Compounds) [Applicable]
<u>Part 2</u> regulates the emissions of sulfur compounds from stationary sources and establishes short-term ambient standards for SO_2 and H_2S. Ambient impacts from any one source are limited to 1,200 ug/m^3 1-hour average, 650 ug/m^3 3-hour average, and 130 ug/m^3 24-hour average. The operator has been unable to demonstrate compliance with these limits by dispersion modeling, but has committed to conducting ambient monitoring as provided in Part 3. Requirements for ambient monitoring were included in the Title V operating permit.

OAC 252:100-33 (Nitrogen Oxides) [Not Applicable]
Subchapter 33 affects new fuel-burning equipment with a rated heat input of 50 MMBTUH or more. The FCCU catalyst regenerator is smaller than the 50 MMBTUH de minimis level.

OAC 252:100-35 (Carbon Monoxide) [Applicable]
Subchapter 35 affects the petroleum catalytic cracking unit (FCCU). Subchapter 35 requires "complete" secondary combustion, which is defined in the rule as removal of 93% or more of the CO generated. The catalyst regenerator provides essentially complete CO combustion, achieving compliance with Subchapter 35.

OAC 252:100-37 (Volatile Organic Compounds) [Applicable]
Part 3 requires storage tanks constructed after December 28, 1974, with a capacity of 400 gallons or more and storing a VOC with a vapor pressure greater than 1.5 psia to be equipped with a permanent submerged fill pipe or with an organic vapor recovery system. Part 3 also requires storage tanks constructed after December 28, 1974, with a capacity of more than 40,000 gallons and storing a VOC with a vapor pressure greater than 1.5 psia to be equipped with a either an external floating roof, a fixed roof with an internal floating cover, a vapor recovery system, or other equally effective control methods approved by the DEQ. The increase in throughput at Tanks T-144 and T-147 does not constitute a "modification," therefore these tanks remain not subject based on construction dates in the 1950s, prior to December 28, 1974.
Part 3 applies to VOC loading facilities constructed after December 24, 1974. Facilities with a throughput greater than 40,000 gallons/day are required to be equipped with a vapor-collection and disposal system unless all loading is accomplished by bottom loading with the hatches of the tank truck or trailer closed. Loading facilities subject to NSPS Subpart XX or NESHAP Subpart R are exempt from these requirements. The light products loading terminal at the refinery is equipped with a vapor-collection and disposal system. This terminal is also subject to NESHAP Subpart R and is exempt from these requirements. Similarly to storage tanks, an increase in throughput of gasoline will not constitute a "modification" of these units.
Part 5 limits the VOC content of coating operations. This facility does not normally conduct coating or painting operations except for routine maintenance of the facility and equipment which is exempt.
Part 7 requires all VOC gases from a vapor recovery blowdown system to be burned by a smokeless flare or equally effective control device unless it is inconsistent with the "Minimum Federal Safety Standards for the Transportation of Natural and Other Gas by Pipeline" or any State of Oklahoma regulatory agency.
Part 7 requires fuel-burning and refuse-burning equipment to be operated and maintained so as to minimize emissions of VOCs. Temperature and available air must be sufficient to provide essentially complete combustion.
Part 7 requires effluent water separators openings or floating roofs to be sealed or equipped with an organic vapor recovery system. The oil water separators process "slop oil" with a vapor pressure below 1.5 psia, the threshold of applicability of Subchapter 37.
Part 7 also requires all reciprocating pumps and compressors to be equipped with packing glands that are properly installed and maintained in good working order and rotating pumps and compressors to be equipped with mechanical seals. Packing glands are periodically inspected and maintained as necessary.

OAC 252:100-41 (Hazardous and Toxic Air Contaminants) [Applicable]
Part 3 addresses hazardous air contaminants. NESHAP, as found in 40 CFR Part 61, are adopted by reference as they exist on July 31, 2002, with the exception of Subparts B, H, I, K, Q, R, T, W and Appendices D and E, all of which address radionuclides. In addition, General Provisions as found in 40 CFR Part 63, Subpart A, and the Maximum Achievable Control Technology (MACT) standards as found in 40 CFR Part 63, Subparts F, G, H, I, J, L, M, N, O, Q, R, S, T, U, W, X, Y, AA, BB, CC, DD, EE, GG, HH, II, JJ, LL, KK, MM, OO, PP, QQ, RR, SS, TT, UU, VV, WW, XX, YY, CCC, DDD, EEE, GGG, HHH, III, JJJ, LLL, MMM, NNN, OOO, PPP, QQQ, RRR, TTT, UUU, VVV, XXX, CCCC, GGGG, HHHH, NNNN, SSSS, TTTT, UUUU, VVVV, and XXXX are hereby adopted by reference as they exist on July 31, 2002. These standards apply to both existing and new sources of HAPs. These requirements are covered in the "Federal Regulations" section.
Part 5 is a state-only requirement governing toxic air contaminants. New sources (constructed after March 9, 1987) emitting any category "A" pollutant above de minimis levels must perform a BACT analysis. All sources are required to demonstrate that emissions of any toxic air contaminant which exceeds the de minimis level do not cause or contribute to a violation of the MAAC. There are four toxic air pollutants whose emissions exceed the de minimis levels and whose emissions are not currently subject to a MACT: aluminum oxide, formaldehyde, nickel, and vanadium. Emissions of aluminum oxide, nickel, and vanadium are from the FCCU stack.

Air dispersion modeling was conducted using the software ISCST3, showing the facility was in compliance with the MAAC for these toxic air pollutants.

Toxic Air Pollutant	C A S Number	MAAC, ug/m^3 (24-hour average)	Impacts, ug/m^3 (24-hour average)
aluminum oxide	1344281	1000	2.28
formaldehyde	50000	12	0.94
nickel	7440020	0.15	0.025
vanadium	7440622	0.5	0.042

The following Oklahoma Air Pollution Control Rules are not applicable to this project:

OAC 252:100-11	Alternative Emissions Reduction	not requested *
OAC 252:100-15	Mobile Sources	not in source category
OAC 252:100-17	Incinerators	not type of emission unit
OAC 252:100-23	Cotton Gins	not type of emission unit
OAC 252:100-24	Grain Elevators	not in source category
OAC 252:100-39	Nonattainment Areas	not in area category
OAC 252:100-47	Landfills	not in source category

* A "bubble permit" was issued for construction of a sulfur recovery unit, Permit No. 92-098-C. This permit has expired without the unit having been constructed.

SECTION VIII. FEDERAL REGULATIONS

PSD, 40 CFR Part 52 [Not Applicable to this Project]
The facility has been issued two PSD permits. The facility is a major source for NOx, CO, SO_2, PM_{10}, and VOC. Any future increases must be evaluated in the context of PSD significance levels: 40 TPY NOx, 100 TPY CO, 40 TPY SO_2, 15 TPY PM_{10}, 40 TPY VOC, 10 TPY TRS, or 0.6 TPY lead. The project, as described, would be "routine maintenance, repair and replacement" which is excluded from being a "modification" under PSD.

NSPS, 40 CFR Part 60 [Subpart J Is Applicable]
Subpart J (Petroleum Refineries) applies to the following affected facilities in petroleum refineries: fluid catalytic cracking unit catalyst regenerators, fuel gas combustion devices, and Claus sulfur recovery plants. All fluid catalytic cracking unit catalyst regenerators which commence construction or modification after June 11, 1973, but before January 17, 1984, are subject to the following limitations:

- a PM emission limitation of 0.1 lb/1,000 lbs of coke burn-off, which is required to be continuously monitored and recorded;
- a CO emission limitation of 500 ppm by volume on a dry basis which is required to be continuously monitored and recorded; and

All emission limits, monitoring, and recordkeeping requirements have been incorporated into the Title V operating permit.

Subpart K (Storage Vessels for Petroleum Liquids) affects storage vessels for petroleum liquids which have a storage capacity greater than 40,000 gallons but less than 65,000 gallons and which commenced construction, reconstruction, or modification after March 8, 1974, or which have a capacity greater than 65,000 gallons which commenced construction, reconstruction, or modification after June 11, 1973, and prior to May 19, 1978. Petroleum liquids does not include diesel, jet fuel, and kerosene. Tanks T-144 and T-147 were constructed prior to the effective date of this subpart, and an increase in throughput does not constitute a "modification" under NSPS.

Subpart Ka (Storage Vessels for Petroleum Liquids) affects storage vessels for petroleum liquids which have a storage capacity greater than 40,000 gallons and which commenced construction, reconstruction, or modification after May 18, 1978, and prior to July 23, 1984. Storage vessels storing a petroleum liquid with a true vapor pressure of 1.5 psia to 11.1 psia are required to be equipped with an external floating roof, a fixed roof with an internal floating cover, a vapor recovery system, or their equivalent. Tanks T-144 and T-147 were constructed prior to the effective date of this subpart, and an increase in throughput does not constitute a "modification" under NSPS.

Subpart Kb (VOL Storage Vessels) affects storage vessels for volatile organic liquids (VOLs) which have a storage capacity greater than or equal to 10,567 gallons and which commenced construction, reconstruction, or modification after July 23, 1984. Tanks T-144 and T-147 were constructed prior to the effective date of this subpart, and an increase in throughput does not constitute a "modification" under NSPS.

Subpart XX (Bulk Gasoline Terminals) affects loading racks at a bulk gasoline terminals which deliver liquid product into gasoline tank trucks and that commenced construction or modification after December 17, 1980. Subpart XX affects the total of all the loading racks at a bulk gasoline terminal. "Loading rack" is defined as "the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill delivery tanks trucks." The loading terminal was modified in 1986 by the addition of a loading rack. New vapor processing systems are limited to 35 mg of VOC per liter of gasoline loaded. The loading system and all tank trucks are required to be vapor-tight. Initial testing of valves, piping, meters, etc. is required to use Method 21 (10,000 ppm VOC leak threshold), but after initial testing, monthly inspection of potential leak components is acceptable. Subpart XX affects the product loading terminal, EUG-20. The increase in throughput of gasoline will not affect the status of the loading terminal with respect to NSPS.

Subpart GGG (Equipment Leaks of VOC in Petroleum Refineries) affects each valve, pump, pressure relief device, sampling connection system, open-ended valve or line, and flange or other connector in VOC service at a process unit which commenced construction or modification after January 4, 1983, and which is located at a petroleum refinery. There are no fugitive leakage components in the part of the FCCU in question.

Subpart QQQ (VOC Emission from Petroleum Refinery Wastewater Systems) applies to individual drain systems, oil-water separators, and aggregate facilities located in a petroleum refinery and which commenced construction, modification, or reconstruction after May 4, 1987. The FCCU drain system was constructed prior to the effective date of this subpart, and an increase in throughput does not constitute a "modification" under NSPS.

NESHAP, 40 CFR Part 61 [Applicable]
Subpart FF (Benzene-contaminated Waste Operations) affects wastewater treatment systems at petroleum refineries where benzene content of wastewaters exceed 1.0 metric ton per year. Those refineries whose benzene content is between 1.0 and 10.0 metric tons per year are required only to analyze the wastewaters for the presence of benzene to demonstrate that the amount of benzene in wastewater at the refinery is less than 10.0 TPY. The Title V application included an analysis of wastewater streams showing a benzene content of 4.81 metric tons in 1997.

NESHAP, 40 CFR Part 63 [Applicable]
Subpart CC (Petroleum Refineries) affects, process vents (except FCCUs and catalyst regenerators) with HAP concentrations exceeding 20 ppm, storage vessels, wastewater streams and treatment, equipment leaks, gasoline loading racks, marine vessel loading system, and pipeline breakout stations. Of the affected equipment, storage tanks, equipment leaks, process vents, wastewater streams and treatment, and a gasoline loading rack are present at this refinery.

Storage tanks: existing storage tanks with HAP concentrations above 4% and which have vapor pressures above 1.5 psia are required to implement controls identical to NSPS Subpart Kb. Tanks T-144 and T-147 are subject to MACT requirements.

Process Vents: any refinery unit process vent with greater than 20 ppm HAPs and which emit more than 33 kg/day VOC are subject to control requirments. Subpart CC requires affected vents to be equipped with 98% efficient controls, vented to a flare, be vented to a combustion unit firebox, or reduced to 20 ppm HAP or less. There are no affected process vents in this project.

Equipment Leaks: these standards affect valves, flanges, pumps, and compressors except for compressors in hydrogen service. Process streams with 5% or more HAPs are required to comply. Subpart CC provides a phased schedule of compliance with standards. Phase III standards came into effect on February 18, 2001.

Gasoline Loading Terminal: Subpart CC states that the requirements of Subpart R are applicable but with an August 18, 1998, compliance deadline. Subpart R limits total VOC emissions to 10 mg per liter gasoline loaded, requires on meters, arms, and other components which may leak, and requires that tank trucks loaded be vapor-tight. The facility has a carbon adsorption unit and CEM on the discharge to comply with these standards.

Wastewater Streams and Treatment: Subpart CC requires refineries whose benzene content in wastewater is between 1 and 10 metric tons per year to monitor benzene content. (Subpart CC repeats standards for 40 CFR Part 61 Subpart FF for benzene-contaminated wastewater systems).

Subpart UUU (Petroleum Refineries Catalytic Cracking, Catalytic Reforming, and Sulfur Plant Units) was promulgated on April 11, 2002. The compliance date for this regulation is April 11, 2005. The FCCU catalyst regenerator will be subject to these standards on that date.

Compliance Assurance Monitoring, 40 CFR Part 64 [Applicable]
Compliance Assurance Monitoring, as published in the Federal Register on October 22, 1997, applies to any pollutant specific emission unit at a major source, that is required to obtain a Title V permit, if it meets all the following criteria:

- It is subject to an emission limit or standard for an applicable regulated air pollutant.
- It uses a control device to achieve compliance with the applicable emission limit or standard.
- It has potential emissions, prior to the control device, of the applicable regulated air pollutant of 100 TPY.

CAM states that any facility which submitted a Title V permit application prior to April 20, 1998, had until that permit was required to be renewed until the standards were effective for that facility. This application was received on April 6, 1998, two weeks prior to the deadline. Therefore, the regulation is applicable, but compliance is not required until renewal of the Title V permit unless there is a significant modification or revision.

Chemical Accident Prevention Provisions, 40 CFR Part 68 [Applicable]
Toxic and flammable substances subject to this regulation are present in the facility in quantities greater than the threshold quantities. A Risk Management Plan was submitted to EPA on June 17, 1999, and was determined to be complete. More information on this federal program is available on the web page: *www.epa.gov/ceppo*.

Stratospheric Ozone Protection, 40 CFR Part 82 [Applicable]
This facility does not produce, consume, recycle, import, or export any controlled substances or controlled products as defined in this part, nor does the facility perform service on motor (fleet) vehicles which involves ozone-depleting substances. Therefore, as currently operated, this facility is not subject to these requirements. To the extent that the facility has air-conditioning units that apply, the permit requires compliance with Part 82.

SECTION IX. COMPLIANCE

Inspection/Testing
On February 12-13, 2003, performance tests were conducted to determine compliance with emissions limitations of Permit No. 1998-117-C (PSD) for the FCCU Unit. Performance testing demonstrated that the FCCU was in compliance with permit limitations for PM and NOx.

Pollutant	Permit Limit	Test Result
NOx	62.1 lb/hr	38.67 lb/hr
PM	15.4 lb/hr	3.55 lb/hr
	1 lb / 1000 lbs coke burn-off	0.26 lb / 1000 lbs coke burn-off
Opacity	30%	6.21%

The facility was inspected on June 26, 2001, by Mr. John Munro and Mr. Doyle McWhirter, both of the AQD Enforcement Unit. No violations were noted during that inspection.

Tier Classification and Public Review

Applicability Determinations are not subject to tier classification.

Information on all permit actions is available for review by the public in the Air Quality section of the DEQ Web page:*http://www.deq.state.ok.us/*

Fees Paid

Applicability Determination fee of $250.

SECTION X. SUMMARY

The proposed change will not be subject to PSD, NSPS or NESHAP. Approval of a letter to Wynnewood Refining Company is recommended notifying them that a construction permit is not necessary.